

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-229263

(43)Date of publication of application : 24.08.2001

(51)Int.Cl.

G06F 17/60
G06K 17/00

(21)Application number : 2000-040484

(22)Date of filing : 18.02.2000

(71)Applicant : FUJI XEROX CO LTD

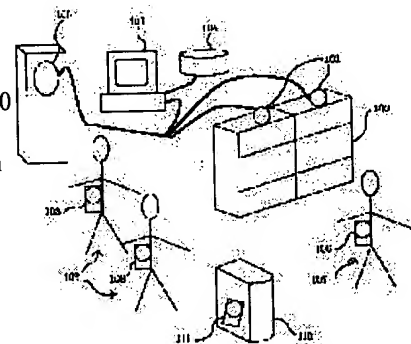
(72)Inventor : ODA YASUNORI

(54) ARTICLE MANAGING SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To make easily manageable the lending of articles.

SOLUTION: A reader/writer 105 is arranged in the exit gate of a library. Readers/writers 101 are installed for every block in a bookshelf 100. RFID 111 having writing areas are loaded in books 110 in each block. When a user 107 having RFID 106 approaches the bookshelf 100, reader/writer 101 obtains the ID number of the user 107 from RFID 106 and writes it in RFID 111 of the book 110 in the bookshelf 100. When the user 107 passes through the exit gate by holding a book 110, the reader/writer 105 detects RFID 106 and 111 of the user and the book. Even if the plural users simultaneously pass through the exit gate, the ID numbers of the users taking out the books from placed positions are written in RFID 111 of the individual books. Thus, a person borrowing the book can be identified by reading the number.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2000 Japan Patent Office

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The goods managerial system which is characterized by providing the following and which manages carrying out of the goods from a management field. RFID which has the write-in field which can be written while the goods for management are equipped and memorizing peculiar ID of the goods. RFID which is carried by the user and memorizes the user's peculiar ID. The first reader writer which reads RFID to peculiar ID of the aforementioned user who is the first reader writer which stores the storage partition of the aforementioned goods in the aforementioned management field in a communication region, and is in the communication region, and writes peculiar ID of the user who read in the write-in field of RFID of the aforementioned goods in the aforementioned communication region. A judgment means judge the user who carried out the goods concerned from the information on the write-in field of peculiar ID of the user and goods which the second reader writer which reads the information on the write-in field of RFID to each peculiar ID and RFID of goods of the user who stores the outlet of the aforementioned management field in a communication region, and passes the communication region, and goods, and the reader writer of the above second read, and RFID of goods.

[Claim 2] It is the goods managerial system which is a goods managerial system according to claim 1, and is characterized by the aforementioned judgment means judging with the corresponding user having carried out the goods when the information on the write-in field of RFID of the aforementioned goods read by the reader writer of the above second corresponded to either of peculiar ID of the one or more aforementioned users who read simultaneously.

[Claim 3] The goods managerial system which is characterized by providing the following and which manages carrying out of the goods from a management field. RFID with which the goods for management are equipped and which memorizes peculiar ID of the goods. RFID which is carried by the user and memorizes the user's peculiar ID. The reader writer which reads RFID to each peculiar ID of the user who stores the outlet of the aforementioned management field in a communication region, and passes the communication region, and goods. A judgment means to judge with the user having carried out the goods when peculiar ID of a user and goods is simultaneously read by the aforementioned reader writer.

[Claim 4] The first reader writer which stores the storage partition of RFID which memorizes the information with which the goods for which is characterized by providing the following] management are equipped, and which contains peculiar ID of the goods, RFID which has the write-in field which can be written while being carried by the user and memorizing the user's peculiar ID, and the aforementioned goods in a management field in a communication region. The first reader writer which reads storage information from RFID of the goods in the aforementioned communication region, and is written in the write-in field of the user's RFID when the aforementioned user's RFID is detected in the communication region. An information presentation means to show the information about the goods in the aforementioned storage partition to the aforementioned user based on the information written in the write-in field of the aforementioned user's RFID.

[Claim 5] The system characterized by providing the following. RFID which is carried by the user and has peculiar ID and the write-in field which can be written. every which belongs peculiar ID to the group although it was represented in two or more above RFID specified as a group, and selection was received and it was chosen -- the first reader writer which writes the amount of payment in the aforementioned write-in field of RFID of the representation then chosen while writing in as a representative ID to the aforementioned write-in field of RFID. The second reader writer which can write the amount of use in the write-in field of each aforementioned RFID. every read by the third reader writer prepared in the outlet gate, and the reader writer of the above third -- a means to liquidate the amount of use read from RFID which has the same representation ID based on the information on RFID from the amount of payment written in RFID which has the representation ID as peculiar ID

[Claim 6] The goods managerial system which is a system according to claim 1, 2, or 4, and is characterized by operating the reader writer of the above first only when it has the narrow user detection means of the detection range and a user is detected with this user detection means rather than the reader writer of the above first which detects contiguity of the user to the storage partition of the aforementioned goods further.

[Claim 7] The goods managerial system characterized by arranging to a single tier, piling up a mutual communication region by what are systems according to claim 1, 2, or 4, and adjoin each other in two or more first reader writers, and operating No. odd, a reader writer, and the reader writer of No. even by turns in the array.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the system for managements of carrying out of the goods from a certain zone, such as loan management of the books in a bookroom.

[0002]

[Description of the Prior Art] Conventionally, the user read the bar code or magnetic stripe which took out books, brought to the specific place and was added to books, and was performing liquidation and loan processing. Moreover, the books information was able to be acquired only by taking in its hand and seeing books, or inputting ID of the books, and taking out information from a database.

[0003] In recent years, RFID is used for various uses. RFID is the module equipped with the storage chip which memorized the information on ID information and others, and the antenna for communication, can communicate by the principle of an antenna called a reader writer and electromagnetic induction, and can exchange information. As RFID, a thing, a smaller thing, etc. of card size are used well.

[0004] Such RFID and the reader writer are called the stuck type (a non-cell, about several mm communication range), the approached type (a non-cell, about 20 - 30cm of communication ranges), the near type (a non-cell, about 70 - 100cm of communication ranges), and microwave type (about [Those with a cell, several communication ranges] m) according to the communication range and use frequency band. Moreover, in these systems, multiread, i.e., the function to read two or more RFID(s) simultaneously, is put in practical use in recent years.

[0005] Some systems which perform loan management of books or goods using this RFID are proposed. The example which applied RFID to the existing books loan system has some which are shown in JP,10-307871,A. In this system, when a user went to a counter and brought his own ID card and books close to the read station of the terminal prepared there, processing of a loan and return was carried out. In this case, only every one person per terminal can do processing of a loan etc.

[0006] On the other hand, these people have proposed the technology of performing loan processing in [persons / two or more] simultaneous parallel Japanese Patent Application No. No. 345334 / 11 to /. With this technology, when the function of distance recognition is prepared in the system of a RFID-reader writer and RFID of books and a user's RFID have been simultaneously recognized within the same range, it is judged that loan or return was performed. However, it is necessary to make two or more antennas with which communication ranges differ build in RFID, and cost becomes high with this technology.

[0007] Moreover, the radio antenna was placed near the goods and the system which can read the written-in content with a small personal digital assistant machine was developed in recent years. However, this needs to set up beforehand the item information emitted from each antenna. Although it is a system using the MAG, the system which can also display the related goods of a loan object on a user is indicated by JP,10-320638,A.

[0008]

[Problem(s) to be Solved by the Invention] this invention aims at offering the system which can carry out loan processing simultaneously about two or more persons. Moreover, this invention aims at enabling it to acquire the information on the goods, even if a user does not take goods in a hand directly or does not change contents.

[0009]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the system concerning this invention RFID which has the write-in field which can be written while being the goods managerial system which manages carrying out of the goods from a management field, equipping the goods for management and memorizing peculiar ID of the goods, It is the first reader writer which stores the storage partition of RFID which is carried by the user and memorizes the user's peculiar ID, and the aforementioned goods in the aforementioned management field in a communication region. The first reader writer which reads RFID to peculiar ID of the aforementioned user who is in the communication region, and writes peculiar ID of the user who read in the write-in field of RFID of the aforementioned goods in the aforementioned communication region, The second reader writer which reads the information on the write-in field of RFID to each peculiar ID and RFID of goods of the user who stores the outlet of the aforementioned management field in a communication region, and passes the communication region, and goods, It has a judgment means to judge the user who carried out the goods concerned from the information on the write-in field of peculiar ID of the user and goods which the reader writer of the above second read, and RFID of goods.

[0010] In this system, peculiar ID of the user approaching the storage partition of goods is written in RFID of the goods from the first reader writer. When goods separated from the communication region of the first reader writer and a user carries out goods from a storage partition since the writing was no longer performed, the user in whom peculiar ID was finally written by the write-in field of the goods can presume what took out the goods from the storage partition. Therefore, even when two or more users pass through the outlet gate simultaneously, those who are going to carry out the goods can be specified among the users of these plurality by reading the information on the write-in field of RFID of goods.

[0011] Moreover, while the goods for management are equipped with the system concerning this invention, being carried by the user with RFID which memorizes the information containing peculiar ID of the goods and memorizing the user's peculiar ID It is the first reader writer which stores the storage partition of RFID which has the write-in field which can be written, and the aforementioned goods in the

aforementioned management field in a communication region. The first reader writer which reads storage information from RFID of the goods in the aforementioned communication region, and is written in the write-in field of the user's RFID when the aforementioned user's RFID is detected in the communication region, Based on the information written in the write-in field of the aforementioned user's RFID, it has an information presentation means to show the information about the goods in the aforementioned storage partition to the aforementioned user.

[0012] According to this system, even if a user does not take goods in his hand, the information about the goods is acquirable.

[0013]

[Embodiments of the Invention] Hereafter, the gestalt (henceforth an operation gestalt) of suitable operation of this invention is explained with reference to a drawing.

[0014] [Operation gestalt 1] Suppose that a microwave type or the near type is used as RFID / a reader writer with this operation gestalt. Drawing 1 is the outline block diagram of the system of this operation gestalt. Here, it supposes that the goods for management are books, and the operation gestalt for loan management of the books 110 in the bookshelf 100 put on the bookroom is explained.

[0015] For every lot, the first reader writer 101 is installed in the bookshelf 100 so that the field in the partition and the front field of the partition may be simultaneously made into a communication region.

[0016] Each books 110 arranged at a bookshelf 100 are equipped with RFID111. The storage chip of this RFID111 is further equipped with the circuit for the R/W to these fields including the field which carries out fixed storage of the unique identification number, and the write-field which can write various kinds of information.

[0017] On the other hand, a user 107 carries RFID106 equipped with the chip which memorized the identification number.

[0018] RFID 111 and 106 of books 110 and a user 107 will answer a letter in a response wave including information, such as an identification number memorized in the storage chip, if a question wave is received from a reader writer.

[0019] The first reader writer 101 prepared in the bookshelf 100 sends a question wave for every predetermined inspection interval, receives the response wave from RFID106 of the user 107 who is in the communication region of the reader writer 101 concerned, and acquires the information on an identification number from the response wave which received. In addition, if it considers as the numeric value of a different range from the identification number which gives the identification number given to a user, for example to books although there is a response wave also from RFID111 of books 110 when a question wave is emitted (for example, it distinguishes by the most significant digit), only a user's thing can be extracted from the identification number of RFID which received. Moreover, instead, from the first reader writer 101, the numerical range of a user's identification number may be specified, and the question wave directed that only RFID of the range answers may be emitted.

[0020] By such processing, the user who is near the bookshelf 100 can be specified for every inspection interval. And a user's identification number which the first reader writer 101 detected whenever it did in this way and detection of a user's 107 RFID106 was performed is written in RFID111 of all the books 110 in a communication region.

[0021] Drawing 2 shows the logical structure of the data which RFID111 attached to books 110 memorizes. The peculiar identification number 200 of the RFID111 very thing and the write-in identification number 201 written in from the first reader writer 101 to a write-in field are fundamentally memorized by RFID111. A user's detected identification number is not written in the write-in identification number. Copyright (C); 1998,2000 Japan Patent Office □ decision of rejection □ decision of rejection or application converted registration □. Thus, number to the user identification number. Thereby, the peculiar identification number read from RFID106 of a user and the write-in identification number (this corresponds to a user's identification number) read from RFID111 of books are distinguishable.

[0022] The write-in identification number 201 which RFID111 of books 110 holds is updated by the first reader writer 101 for every inspection interval. That is, whenever the first reader writer 101 receives RFID106 to a user's response wave, it overwrites the identification number of the user who read in the response wave to the write-in field of RFID111 of each books 110 in a communication region. And if books 110 separate from the communication region of the first reader writer 101, the write-in identification number 201 of RFID111 of these books will not be updated henceforth. Therefore, when a certain user 107 picks out books 110 from a bookshelf 100 and separates from a bookshelf 100, the user's 107 identification number will be written in the write-in field of RFID111 of the books 110. In addition, in case RFID111 of books emits a response wave, it includes not only the peculiar identification number 200 of the books concerned but the information on the write-in identification number 201 in the response wave.

[0023] The second reader writer 105 is installed in the outlet of a bookroom. The second reader writer 105 stores the whole region of an outlet in a self communication region. When there are two or more outlets, the second reader writer 105 is installed for each outlet of every. The second reader writer 105 emits a question wave for every predetermined inspection interval, and is awaiting the user to it, and the response wave from RFID of books.

[0024] When a user 109 is going to carry books 110 and is going to come out from a bookroom, the communication region of the second reader writer 105 prepared in the outlet will be passed. The second reader writer 105 reads RFID108 of the user 109 who passes the communication region, and RFID111 of the carried books 110. At this time, a user's peculiar identification number is read in RFID108 of a user, and the peculiar identification number 200 of the books concerned and the write-in identification number 201 written in the write-in field are read in RFID111 of books.

[0025] The second reader writer 105 transmits the information on the identification number extracted from the response wave which received corresponding to the question wave at that time to a management computer 103 for every inspection timing. A management computer 103 performs loan processing based on the information on the identification number group received at this time.

[0026] The peculiar identification numbers of a user's peculiar identification number and books and all the write-in identification numbers (refer to drawing 2) read from RFID111 of books may be contained in the identification number group which a management computer 103 receives from the second reader writer 105 in each inspection timing for every predetermined inspection interval. Here, since books 110 are not carried out from the bookroom when the identification number group received to a certain inspection timing is only a user's peculiar identification number, loan processing is not performed.

[0027] If the number of the identification numbers of the user at that time is one when both a user's peculiar identification number and the peculiar identification number of books are contained in the identification number group received to a certain inspection timing, the user judges it as what began to borrow these books (it can specify by both peculiar identification numbers). In this case, a management computer

103 registers into the loan management database 104 the information on the purport that the user borrowed these books.

[0028] On the other hand, when it is detected that one or more books and two or more users passed through the outlet simultaneously by the second reader writer 105, handling becomes complicated somewhat. The "simultaneous" nature of outlet passage is judged by every inspection interval (namely, transmitting interval of a question wave). Therefore, if it is separated to pass the communication region of the second reader writer 105 more than the inspection interval, these users will be detected to separate timing (it becomes namely, less "simultaneous"). In a RFID system in recent years, since much RFID(s) can be read in 0.1 or less seconds (multiread), an inspection interval can be set as the short time for 0.1 or less seconds. Therefore, it is hard to start that two or more users are detected simultaneously at an outlet.

[0029] When books and two or more users pass through an outlet simultaneously, it is necessary to judge whether the books were carried out by any of these users (when having passed simultaneously correctly is recorded). In such a case, a management computer 103 performs the judgment using the information on the write-in identification number 201 read in RFID111 of books. The method of this judgment is explained using drawing 3. In drawing 3, a horizontal axis expresses time and the identification number groups acquired by each inspection timing T_i (i is an integer) are enumerated on the timing.

[0030] In the expedient top of explanation, and drawing 3, the peculiar identification number of books and a user is the form of I^* ($*$ is a number), and a write-in identification number is described in the form of W^* . For example, although both " $I1$ " and " $W1$ " are related with the user of the identification number of No. 1, the specific number to which the former was read from the user RFID108, and the latter are the write-in identification numbers read from books RFID111. Although a user's peculiar identification number " I^* " is independent, it writes in the peculiar identification number " I^* " of books, and the identification number " W^* " accompanies. It is because these peculiar identification numbers and a write-in identification number are simultaneously received from RFID111 of books.

[0031] In the inspection timing $T1$, since the man of peculiar ID " $I1$ " is only detected only for one person, as for a user, the man understands [of an identification number " $I2$ " and " $I3$ " / that two books are carried]. This is understood also from both the write-in identification numbers that accompany " $I2$ " and " $I3$ " being " $W1$ " (it corresponding to the user of No. 1). In this case, a management computer 103 judges that the user of an identification number " $I1$ " began to borrow an identification number " $I2$ " and the books of " $I3$ ", and registers a required matter into the management database 104.

[0032] On the other hand, to the inspection timing $T2$, two users are detected simultaneously and identification number " $I1$ " and " $I4$ " are detected more nearly simultaneously [the books / " $I2$ ", " $I3$ " and " $I5$ "] three volumes. A management computer 103 judges by above-mentioned any of the two persons these three volumes were able to begin to borrow, respectively by the write-in identification number " W^* " which accompanies the peculiar identification number " I^* " of these books. That is, since it writes in books ID " $I3$ " and the identification number " $W1$ " accompanies, it can judge that it was able to be begun by the user " $I1$ " borrow these books " $I3$." It can judge similarly that it was able to be begun by the user " $I4$ " borrow books " $I2$ " and " $I5$." Even when it does in this way and two or more persons pass through an outlet simultaneously, a management computer 103 can specify which books each carried out, and can perform processing for loans, such as registration to a database 104.

[0033] Thus, according to this operation form, even if a user does not bring books to a loan counter etc., he can receive loan processing automatically only by passing through an outlet. Moreover, with this operation form, it can discriminate from which books though two or more persons passed through the outlet simultaneously, each carried out, and loan processing can be performed. It becomes unnecessary therefore, to make [along which one person passes at a time] the outlet of a bookroom narrow according to this operation form.

[0034] Suppose that a microwave type or the near type is used as a system of [operation form 2] RFID / reader writer. The system configuration itself is the same as that of the thing of the operation form 1 shown in drawing 1, and it is good. That is, the first reader writer 101 is installed so that human being who stands on the front face of the partition in the partition may be stored in a communication region for every lot of a bookshelf 100. Each books 110 are equipped with RFID111 which carries out fixed storage of a peculiar identification number and various kinds of books information, such as bibliographic information of the books, and contents introduction information. On the other hand, a user 107 carries RFID106 holding the write-in field which can be written while memorizing a peculiar identification number.

[0035] The first reader writer 101 sends a question wave at a certain fixed interval, and detects RFID106 of the user who is in a communication region. A peculiar identification number and books information are read from RFID with which all the books that the first reader writer 101 has in a communication region whenever detection of a user of RFID106 is performed were equipped, and those information is transmitted and written in RFID106 of a user detected. In RFID106 of a user, the received information is written in and it writes in a field.

[0036] A user's storage information on RFID106 can read the contents using another reader writer. For example, if the user carries the portable small notebook computer which built in the small reader writer, the books information memorized by RFID106 in the notebook computer can be read and displayed. Or it is good also as a thing connectable with a notebook computer through an adapter in that a user's RFID should be based on the specification of the type I card of a notebook computer, or a type II card ****. Drawing 4 expresses the composition which included the antenna 401 of RFID in Type I or the II card 400.

[0037] According to this operation form, only by going near the bookshelf with which books are displayed, since the information on these books is stored to a user (namely, RFID), using a personal digital assistant etc., the information can be read from RFID and can be displayed. Therefore, according to this operation form, even if it does not actually take books in its hand, a certain amount of information can be acquired. It is convenient when books are in a place which a hand does not reach especially.

[0038] Moreover, according to this operation form, after a user separates from a bookshelf, reconfirmation of what suited the surroundings was can carry out, without depending on human being's memory. The position of the antenna of the first reader writer can be changed, the direct reading of the target books can be changed, and registration of data requires only 1 time.

[0039] In addition, although RFID of books was made to memorize not only a peculiar identification number but information, such as bibliographic information, you may make it make RFID of books instead memorize only a peculiar identification number with the above-mentioned operation form. In this case, only the peculiar identification number of the books which were able to be read by the first reader writer 101 will be written in a user's RFID. In the notebook computer which a user carries, this identification number is read from a user's RFID, and the books information corresponding to this identification number is read from the management database 104, and is

displayed.

[0040] It is inconvenient in a dining-room or a souvenir shop often [use / cash /, and]. / cutting a ticket with some points in the [operation form 3] amusement park When there is much especially number, the latency time arises and a customer's displeasure is invited. On the other hand, using common RFID with cybermoney etc. is proposed. However, when a child is small, as for it [in family **** etc. / each child / t form of cybermoney / some money], in addition to the problem of loss, for parents, management of a child becomes impossible, and it is t cause of headache.

[0041] Therefore, the structure which can perform such management easily using the special feature of RFID is searched for, maintaining the method of the money management as conventional.

[0042] For example, in the case of a typical four-person family, one of parents has a RFID card (it is called a parent card) with a liquidation function, and gives other three persons a RFID card without a liquidation function. However, it carries out to storing the identification number of a parent card in a RFID card without a liquidation function. Moreover, it enables it to add the amount of use to every RFID card. Moreover, the column of a use upper limit frame is prepared and you may make it prevent past [usage].

[0043] First, a user pays in advance the amount of money which an admission fee is paid at an amusement-park entrance, and also is appropriated for ticket price and shoppings, such as a vehicle, and has a RFID card with a cybermoney function delivered. It can deliver on RFID card at a time to groups, such as a family, for every everybody, and the parent card which gives a liquidation function (namely, cybermoney function) among the cards of these plurality can be limited to them with this operation form.

[0044] An example of the logical structure of the data which a RFID card memorizes is shown in drawing 5. In this example, the stored data structure of RFID contains five, the peculiar ID column 500, the parent ID column 501, the number column 502 of members, the amount column 503 of payment, and amount column of use 504**. A unique identification number peculiar to the RFID concerned is written in the peculiar ID column 500. When two or more RFID cards are published to a group, the identification number of the card (parent card) of the representation which has a liquidation function in it is written in the parent ID column 501. For parent card itself, the number of the peculiar ID column 500 and the parent ID column 501 is in agreement. Moreover, in addition to the identification number of a parent card, if an actual name is written in, it will become useful in the following missing-child guidance. The number of members of a group is written in the number column 502 of members. The amount of money paid in advance at the time of card issue is written in the amount column 503 of payment, and this serves as cybermoney. In order to facilitate processing of a reader writer, you may make it write the amount of payment all cards, although it is almost meaningless to write the amount of payment in a child card (things other than the parent card among the card of each one of groups), since only a parent card actually has a liquidation function. Furthermore, in the case of a child card, the temporary amount of the maximum use is written in and past [usage] can be prevented. The amount of money which each one held the amount column 504 of use, and was used for the purchase of the article in the ticket and stand of a thing is written in.

[0045] Drawing 6 expresses the processing algorithm of the initialization processing of the contents of storage of a RFID card performed at the time of entrance etc.

[0046] Some RFID cards used for a user (group) are made first to choose, and a reader writer is made to read (Step 611). And the parent card which gives a liquidation function among these cards is chosen (Step 612). A parent card may be automatically decided by the reader writer side, and a user may be made to choose it. Methods, such as choosing the minimum thing of ID among the cards chosen as an easy method, can be considered.

[0047] if a parent card is chosen, a reader writer will boil and write the identification number of the card in the parent ID column 501 of all cards (Step 613) In this case, the parent card itself can recognize that the card is a parent card, when the content of the card is read from the later, since the parents ID written in self ID and parent ID column 501 of the peculiar ID column 500 became the same.

[0048] next, since the number of sheets of the card read by the reader writer is understood immediately, the number column 502 of members of these all card is boiled, and this number of sheets is written in (Step 614) In addition, although this number of members is used only in the case of processing of a parent card, since it is easier as processing to write in all cards rather than it writes in alternatively only to a parent card, it is made to write in all cards here here. Finally the amount of money which the user paid in advance is inputted from a terminal etc., and the numeric value is written in the amount column 503 of payment of a parent card (Step 615). In addition, in order to simplify the write-in processing by the reader writer, you may also write the amount of payment in all the cards of a group (what is necessary is just to disregard the value of the amount column of payment of a child card by the system by the side of liquidation in this case).

[0049] Now, the liquidation to purchase in the amusement park of groups, such as a family, is made at the outlet gate. In the system of this operation gestalt, a reader writer is prepared in the outlet gate. And in case a group comes out of an amusement park, it is made to be pulled from the value of the amount column 503 of payment of the card in which the value of the amount column 504 of use of each card with the same value of the parent ID column 501 has the parent card number among RFID card groups at the outlet gate in which the reader writer was installed. Here, remainder and the insufficiency of money shall be liquidated on that spot.

[0050] Here, at the outlet gate, when a parent card comes, the identification number and amount of payment, and the number of members are read, and it memorizes in a computer. Liquidation finishes only after the amount of use of all the cards of a group is liquidated. Therefore, child strays, and in the same train, but, when entering back, or when passing through the gate after a while when going into another train, it is processed satisfactory. Moreover, since liquidation is made in case it is memorized and a parent card pocket person comes out of the outlet gate, when the pocket person of a child card passes through the gate previously, it turns out easily that liquidation processing is performed satisfactory also in this case.

[0051] The algorithm of this liquidation method is shown in drawing 7. In this processing, the balance and the number of unsettled cards shall be first initialized by 0. The balance is the balance of cybermoney and the number of unsettled cards is the number of the cards (that is liquidation is not made) which have not come out from the outlet among the RFID cards of each one of groups. These two data are noticed also about a negative value at a bird clapper. By considering a negative value, even if a child card passes previously, a problem does not arise and processing becomes possible. That is, when a child card passes previously, the balance is made into a negative value (namely, overdraft) and a parent card passes behind, it liquidates by lengthening it from the amount 503 of payment. This unsettled number and the balance are variables used by the processing in a computer, and when selection of the card group of a group is performed first, they are initialized. Moreover, these variables shall have the argument of a parent card. Therefore, only the number of different groups will exist [t variable of an unsettled number and the balance].

[0052] The reader writer of the outlet gate sends a question wave at a certain fixed interval, it is waiting for the response wave from a card and if there is no response wave, it will continue (Step 621) sending a question wave. If it detects that the card passed through the gate (the result of Step 621 is Y), a reader writer will read all the data of the card, and it will investigate it in a parent card first. This can be judged as the card being a parent card, when the value of the peculiar ID column 500 of a card and the value of the write-in data (parents ID) of the parent ID column 501 are in agreement, as explained at the time of a data input (Step 622). If the read card is a parent card, the value of the amount column 503 of payment of the card is added to the "balance", it will record (Step 623), next the value of the number column 502 of members of the card will be applied to "the number of unsettled cards" (Step 624). Here, it does not write in the number of unsettled cards like the balance because what is not a parent card may exceed the gate first. Then, the value of the amount column 504 of use of a parent card own [the] is deducted from the balance (Step 625), and the value of the number of unsettled cards is reduced by one (Step 626).

[0053] At Step 622, when judged with the passed card being a child card, it moves to the direct steps 625 and 626, the value of the amount column 504 of use of the card is lengthened from the balance, and the number of unsettled cards is reduced by one.

[0054] And since I hear that all liquidation of the cards of a group did not finish if it inspected whether the number of unsettled cards was 0 (Step 627) and was 0 after reducing the number of unsettled cards by one, liquidation processing is ended. Otherwise, (N of Step 627) in order to wait for passage of the following card, it returns to Step 621.

[0055] Such processing can liquidate the amount of use of all the men of a group.

[0056] In addition, the used cards may be collected, when carrying out bringing use next time, carry out attaching the premium of the amount of payment etc., and may be made for using up to be sufficient and to save resources. Moreover, a reader writer is put on the key point of an amusement park, respectively, and the sum total of the rental fee by present is calculated, or it liquidates in middle, and you may make it past [of gold / usage] etc. known in advance. Moreover, it also enables it to search the name registered from Parents ID by reading these contents of a card, or when it becomes a missing child, as described above, parents' name itself is written in a card, and parents' name may be made to be read immediately.

[0057] Thus, according to this operation form, liquidation processing of RFID of the related member which itself who leaves when it differs from a specific field in time to a certain specific man's RFID in the case of recession also contains etc. can be carried out. Liquidation processing shows immediately whether what strayed is, and the parents name which is most needed in the case of illusion child processing known further immediately.

[0058] [Operation form 4] Infrared formula monitoring system is arranged to near in which the first reader writer 101 is installed. One infrared formula monitoring system is formed to one reader writer 101. Infrared formula monitoring system judges whether a body exists in a covering field by emitting infrared radiation and detecting reflection of the infrared radiation. The covering range of infrared formula monitoring system is made into the near range of 1 partition (namely, the covering range of the reader writer 101) of a bookshelf, and the person who stood in front of the bookshelf sets it as a range which is not detected. This is for enabling it to detect, only when a user lengthens a hand in the books in a bookshelf.

[0059] With this operation form, only when a user is detected with infrared monitoring system, the reader writer 101 corresponding to the system is operated. Operation of the subsequent reader writers 101 is the same as that of what was shown with the operation form 1.

[0060] Since according to this operation form the reader writer 101 with much power consumption operates only when a user lengthens a hand on a bookshelf, saving of power can be performed. Moreover, since the writing of the write-in identification number 201 (refer to drawing 2) to RFID of books is performed only when a user lengthens a hand on a bookshelf, while the identification number of the user who takes books in his hand is certainly written in RFID of books, the probability that other men's identification number will be written in books becomes small.

[0061] Moreover, the infrared monitoring system which covers an outlet is formed also in the outlet gate, and if it is made to operate the second reader writer 105 only when passage of a user is detected by this system, the power consumption of the second reader writer 105 can be reduced.

[0062] In addition, although infrared radiation was used above, the method using other electromagnetic waves is considered the same way.

[0063] When there is two or more first reader writer 101 usually installed in a bookshelf when building a system like the [operation form 5 operation form 1, it is thought that they are installed so that a communication region may not lap, and so that all the books of each partition can cover. It is made for a communication region not to lap for preventing interference of the electric wave between reader writer 101 comrades. This installation state is typically shown in drawing 8. In drawing, a rectangle 700 expresses the antenna of a reader writer and, as for 701, the ellipse form of the dashed line which touches it expresses the communication region of each antenna 700.

[0064] Now, when the place the user is standing when performing processing like the operation form 1 or the operation form 2 in this antenna installation configuration is in the edge of the communication region of a reader writer, a problem arises. For example, the reader writer 101 cannot read the books ID of other halves, although a user's left half or right half located on the edge of a communication region can read the identification number of the books to expect. In this case, in the system of the operation form 2, a user can acquire only the information about a half among the books groups arranged at the partition. Moreover, in loan management like the operation form 1, if a user lengthens a hand to the partition of the next door of his impending bookshelf partition and takes out books, the user's identification number will no longer be written in RFID of the books, and processing like the operation form 1 will become impossible in that case.

[0065] With this operation form, in order to prevent such a problem, a reader writer is not installed so that a communication region may not lap, but it installs so that communication-region 701 comrades of the reader writer 700 which adjoins each other like drawing 9 may overlap. However, if a communication region has duplication in this way, confusion can arise, or interference of an electric wave takes place to pinpointing of the position of detected RFID, and communication can consider a bird clapper difficult. Then, it continues to the reader writer located in a line with the single tier, a number is attached, overlapping a communication region, and it is made to operate the reader writer group of an even number, and the reader writer group of an odd number by turns with this operation form. That is, while the reader writer group of an even number is operating (namely, dispatch of a question wave and reception of the response wave to it), it is made for the reader writer group of an odd number not to operate. Since the reader writers which adjoin each other by carrying out like this do not emit question wave simultaneously or they do not receive a response wave, problems, such as the above-mentioned interference, are solvable. Moreover, since the "dead angle" of reader writer 101 group decreases, when a user takes out books, the user's identification number can write in RFID of the books almost certainly. That is, since RFID of these books and a user will be covered by the communication region of

any one reader writer even if a user will lengthen a hand with all his might and will take books if width of face of the communication region of each reader writer 101 is carried out to more than the width of face to which people extended both hands, and a communication region is overlapped like drawing 9, the user's identification number can be written in RFID of books.

[0066] In addition, although the same books and the same user may be recognized by two adjacent reader writers in the case of the system this operation form, in such a case, supposing that it is in the communication range of the reader writer recognized first etc. defines a rule beforehand, and books and a user should just process.

[0067] Moreover, since according to this operation form a user's identification number is written in and the information on the books group of the more exact front face of the position which stands to RFID of the books of the more exact front face of the position the user is standing as for the user is written in User RFID, the effect of the above-mentioned operation form 1 or the operation form 2 increases.

[0068] In the above, the suitable operation form of this invention was explained. Above, although explained mainly taking the case of loan management of books, this invention is applicable to management of carrying out of not only books but various goods.

[Translation done.]